

# INTEGRATED COASTAL MANAGEMENT IN EMERGING TOURIST DESTINATIONS ON THE MEXICAN CARIBBEAN COAST

MÓNICA ARIADNA CHARGOY ROSAS<sup>1\*</sup>, ÓSCAR FRAUSTO MARTÍNEZ<sup>1†</sup>  
& JOSÉ ALFREDO CABRERA HERNÁNDEZ<sup>2‡</sup>

<sup>1</sup>Universidad Autónoma del Estado de Quintana Roo, México

<sup>2</sup>Universidad de Matanzas, Cuba

## ABSTRACT

Mexico's Caribbean coast is known for its large tourist centres, such as Cancun, Playa del Carmen and Tulum. In 2023, they generated revenues of more than \$20.5 billion, continuously recovering after the COVID-19 pandemic. As a result of new regional development policies (for example, investment in infrastructure such as the Tulum airport and the Mayan Train), the model of expansion of tourist activity along the entire coast continues. The main goal of this study is to present the progress in identifying the key issues and actors described in the State Coastal Policy to recognise areas of opportunity and advance their application at the local level. To do this, we identified key issues (opportunities and threats) by examining the institutional instruments of coastal policy. The results show 11 central themes, 19 focal topics and four key issues: (a) urbanisation and provision of services; (b) integrative vision with diverse actors; (c) environmental or ecosystem connectivity; and (d) management of government agencies. We concluded that these critical issues build the strategies and actions necessary for adopting integrated coastal management in the southern Mexican Caribbean.

*Keywords: policy, sustainable development, tourism, integrated diagnostics.*

## 1 INTRODUCTION

The Caribbean coast of Mexico is known for its large tourist centres such as Cancun, The Riviera Maya (from Playa del Carmen to Tulum), Cozumel and Isla Mujeres. Despite the challenges posed by the COVID pandemic, the tourism industry has shown remarkable resilience, with revenues continuously recovering. In 2020, the tourism destinations generated revenues of more than 15.4 billion dollars and closed the year 2023 with revenues over \$20.5 billion [1].

In Mexico, there is a broad regulatory and institutional framework related to the sustainable management of the country's seas and coastal resources. According to Rivera-Arriaga and Azuz-Adeath [2], there are 14 institutions under the Intergovernmental Commission for the Sustainable Management of the Coasts and Seas of Mexico (CIMARES). Each of these institutions, including those represented by our audience, plays a crucial role in addressing the different issues related to the governance of the coastal zone, conferring to the competencies of each institution member.

In the National Policy of Seas and Coasts of Mexico, Quintana Roo is identified as one of the coastal states of the country bordering the Caribbean Sea, thus known as the Mexican Caribbean (Fig. 1). Othón P. Blanco is the southern coastal municipality of the Mexican Caribbean, bordering Central America through Belize, ranked as the third municipality in the state with the most significant number of inhabitants (233,648) according to INEGI [3].

\*ORCID: <https://orcid.org/0000-0001-8849-2545>

†ORCID: <https://orcid.org/0000-0002-6610-5193>

‡ORCID: <https://orcid.org/0000-0002-2723-3619>



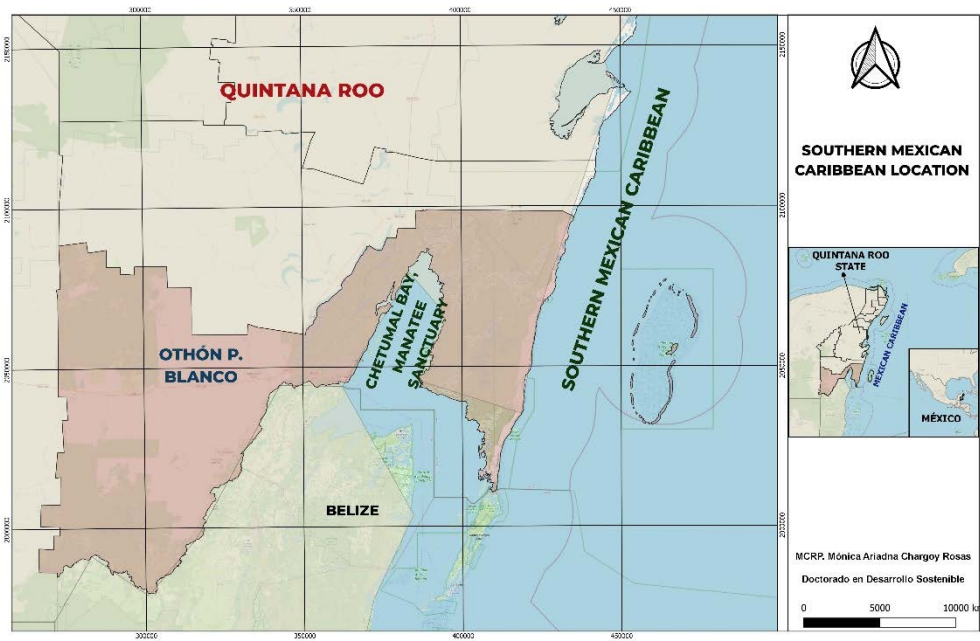


Figure 1: Map of the Southern Mexican Caribbean location at Quintana Roo State.

## 2 THEORETICAL FRAMEWORK

As part of the scope of Agenda 21, the Integrated Coastal Management (MIC) was presented at the Conference on Development and Environment in Rio 1992 as the most promising means to move towards more sustainable human activity on the coasts. However, the challenges are political, as much or more than technical and scientific. The MIC must be transparent and convincing that a set of explicit values constitutes the basis for practice [4].

Integrated Coastal Zone Management (MIZC) is a dynamic and continuous, multifactorial, and complex process [5]–[7]. It is relevant to identify its spatial and temporal scales, as well as the different levels of analysis and dimensions that compose it, as a way of ‘establishing the most urgent areas of attention with regard to the spatial and temporal adequacy of inputs and needs among the different actors involved’ [8].

In Mexico, the development of coastal areas is relatively recent; according to Rivera-Arriaga et al. [7], it was from the sun and beach industry that coastal paradises such as Acapulco, Cancun or Los Cabos were revealed to the world. However, coastal zone management is even more recent and less common since it is understood as a regional planning task, similar in perspective to marine and coastal ecological arrangements. According to the authors, some issues that need to be addressed in coastal areas in Mexico are:

1. The capacities of local governments are constructed by inequitable decentralisation processes.
2. Planning instruments are underutilised for decision-making.
3. The bases of the areas under legal or illegal use are poor, and the income generated should be adequately labelled so that it is used for environmental and development purposes.

4. Participation is required to be expressed as effective involvement in the decision-making process with co-responsibility for implementing control and surveillance measures that can replace the passive reception of information on the environmental challenges of coastal areas.
5. The MIZC in Mexico is based on a legal structure that needs to be strengthened in its financial and operational capacity.
6. An integrated coastal management perspective is required. Ecosystem-based management of mangrove wetlands, coral reefs, seagrasses, and coastal dune systems, among other coastal natural ecosystems, is necessary to reduce their vulnerability and increase their resilience to the effects of climate change.

Although Mexico has a broad regulatory and institutional framework related to the sustainable management of the country's seas and coastal resources [9], regional or state indicators (for example, territorial regulations, risk atlases, and fisheries management plans) continue to be replicated for the coastal zone. This continues to inform general situations but does not report progress or setbacks in the context of the sustainability of the municipalities and their localities.

Vázquez Sosa et al. [10] indicate that the challenge to face is the transition from the elaboration of characterisations and diagnoses of coastal ecosystems and conflicts to the formation and implementation of MIZC programs, particularly at the local level, agreed with governments and authorities, and above all with broad participation of all the actors involved. Through a comparative critical analysis of different models for the implementation of the MIZC, the authors oriented the work towards the elaboration of a proposal for its implementation in Akumal, located in the middle of the Mexican Caribbean Coast. Conclusions indicate that the adoption of a model based on the methodological conceptions of Olsen–ECOCOSTAS–LOICZ, combined with the methodology of Barragan's *Decalogue*, would serve as an initial framework for multiscale MIZC analysis, as a convenient condition for moving towards a local approach to MIZC.

Quintana Roo, the only state bordering the Mexican Caribbean, published on August 26, 2022, the 'Política de Costas del Estado de Quintana Roo' (Coastal Policy of the State of Quintana Roo, referred to henceforward as Coastal Policy or Policy). With this, it became the first state at the national level to have an instrument aligned with the National Policy of the Seas and Coasts. By presenting itself as the first state in the country to have a coastal policy, it became a pioneer and example for the rest of the states with coastal zones. Such achievement also becomes a challenge to ensure the success of its implementation.; with the added pressure of being the number one state nationally in coastal tourism visits, generating an economic spill of over \$15,400 million, according to SEDETUR data for 2020 [11].

Given this situation, the need arises to analyse this Policy within the Integrated Coastal Zone Management framework and find areas of opportunity to advance in its application at the local (municipal) level. This document aims to answer the following questions: What are the key issues, problems, trends, and conflicts found and defined in Quintana Roo State's Coastal Policy Southern Mexican Caribbean? Who are the identified actors and stakeholders? How to build the strategies and actions necessary for implementing integrated coastal management in emerging tourism destinations in the southern Mexican Caribbean?

The objective is to identify the key issues and actors described in Coastal Policy for the Southern Mexican Caribbean to design strategies and actions necessary to implement integrated coastal management programs in emerging tourism destinations in the region.

### 3 METHODOLOGY

The research was developed using qualitative research methods and techniques in two stages. The first stage consisted of the review of secondary sources to define the state of the art. For this, various sources were used, such as indexed and refereed articles, as well as books and book chapters. These were obtained through searches in electronic databases and internet search engines using keywords. In the same way, the information on the Internet pages of official institutions was reviewed and used, registering all the sources for inclusion in the bibliography. The literature review focused on the topics of integrated coastal management, sustainable development, and publications on the Mexican Caribbean particularly the southern localities and emerging tourism destinations. In this first stage, different working meetings were attended, with the German cooperation agency (GIZ) and institutions of the three levels of government as participating observers. There was also attendance at the presentation event of the Coastal Policy and the installation of the Intersectoral State Commission for Sustainable Coastal Management as an observer.

For the second stage of this work, the methodology proposed by Olsen and Ochoa [12] was used, particularly regarding the identification and evaluation of key issues. These are understood as the problems or opportunities on which action is going to be taken and are better visualised when it is possible to graph the expected changes in a trend or opportunity on which you want to act.

In this methodology, five sections correspond each to a step in the coastal management cycle. Each section is subdivided into topics, and for each of these, a series of questions are identified, and each question focuses on some aspect associated with what is known as best practices [6]. For the identification and evaluation of key issues, Olsen and Ochoa [12] indicate that management issues are at the heart of the design of a management effort: the goals, the identification of key actors, the extension of the field of action, the delimitation of the context, the characteristics of the governance system, etc. depend on the management issues (Fig. 2).

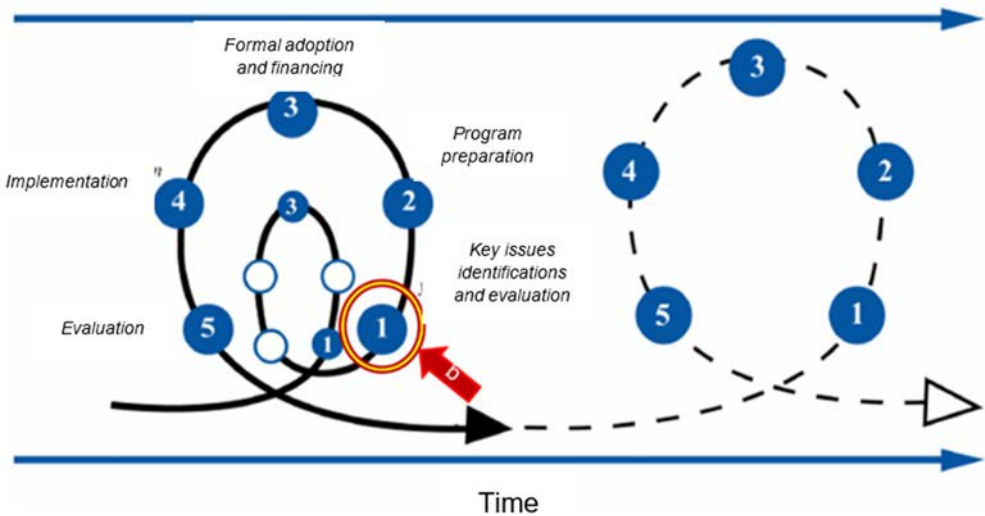


Figure 2: Stage of identification and evaluation of key actors within the sequence of stages along each successive cycle of an integrated coastal zone management programme. (Source: Adapted from GESAMP, 1996; Olsen, et al. [6].)



The identification and evaluation of crucial issues require the following essential actions [6]:

- a. Identify and assess critical environmental, social, and institutional issues and their implications.
- b. Identify the main actors and their interests.
- c. Verify feasibility and governmental and non-governmental leadership on selected issues.
- d. Select the issues on which the management initiative will focus its efforts.
- e. Define the goals of the MC initiative.

The activities listed above are implemented as an external evaluation, in which the questions form a frame of reference for discussions that lead to recommendations [6]. These questions were transcribed in a guide to structure and answer through a critical review of the publication of the Coastal Policy in the Official Newspaper of the State of Quintana Roo on 26 August 2022. To identify the following key issues, understand these as ‘...the problems or critical situations to be solved, potentialities and aspects that stand out of interest for the development of the future scenario that has been raised’ [13]. Below are the results.

#### 4 RESULTS

In this first stage, the environmental, social, and institutional issues are described as the basis of the Coastal Policy published in the Official Gazette. Through the critical analysis of contents, the problems identified for each theme and the defined actors. The initiative is divided into 11 main themes. These themes lay the basis for the definition of the problem and the key issues. Tables 1–3 present the main themes and problems described in the Coastal Policy Decree, organised by socio-environmental, environmental, institutional, legal, governance, and planning themes and problems.

Although all the themes and problems described in the previous table are presented within the Coastal Policy, it is from the Policy’s Integrated Diagnosis that the following key issues could be identified:

1. There are essential delays regarding the development of (a) Basic housing services; (b) Adequate urbanisation (streets and public services); (c) proper land use in areas with highly fragile ecosystems and natural resources.
2. Regulation enforcement often faces deficiencies, mainly due to legal and administrative gaps or overlaps between the three levels of government.
3. Institutions regularly act under a sectorial vision instead of synergic or comprehensive, resulting in a lack of inter-sectorial coordination and a lack of comprehensive vision that incorporates the participation of interdisciplinary actors linked to academia and society.
4. Regarding project implementation, private interest usually comes before common interest and short-term investments are privileged over long-term investments.
5. Technical and scientific information is either lacking or limited in availability in planning or decision-making.
6. There is a lack of continuity, capacities, or performance in the human resources of the government agencies responsible for territorial management, resulting in effective governance with institutional leadership.
7. Coordination of actions in the Caribbean Sea and its connectivity to the Gulf of Mexico and the Atlantic Sea.
8. Environmental or ecosystem connectivity as a basis for coastal planning.



Table 1: Socio-environmental themes and problems described in the Coastal Policy Decree.

| Themes                                                         | Problems                                                                                              |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Trends in the coast                                            | Socio-territorial conflicts                                                                           |
|                                                                | Disorderly urbanisation                                                                               |
|                                                                | Deterioration of coastal ecosystems                                                                   |
|                                                                | Tourism activities                                                                                    |
|                                                                | Contamination of soils, aquifers, and sea                                                             |
|                                                                | Agriculture with the use of agrochemicals                                                             |
|                                                                | Loss of biodiversity                                                                                  |
|                                                                | Loss of environmental services                                                                        |
|                                                                | Forest fires                                                                                          |
|                                                                | Land use change                                                                                       |
| Environmental current features and trends                      | Deforestation processes, causes, and effects                                                          |
|                                                                | Pollution: Surface and groundwater quality (causes)                                                   |
|                                                                | Agrochemicals and pig farming                                                                         |
|                                                                | Sunscreen pollution                                                                                   |
|                                                                | Pollution and affectation from maritime transport                                                     |
|                                                                | Contamination by black water and runoff by waterproofing                                              |
|                                                                | Municipal solid waste                                                                                 |
|                                                                | Saline intrusion                                                                                      |
| Oceanographic dynamics and their socio-environmental influence | Sargasso                                                                                              |
|                                                                | Direct impacts on fishery resources and ecosystem services                                            |
|                                                                | Facilitate intensive fishing                                                                          |
|                                                                | Projected temperature increase by 2050 of up to 2°C                                                   |
|                                                                | Planning processes should aim to reduce precipitation caused by torrential rain events                |
|                                                                | Potential generation of extreme wave events capable of damaging reefs                                 |
|                                                                | Potential increased hurricane intensity and strength                                                  |
|                                                                | Karstification of the aquifer implies rapid infiltration from the surface and transport of pollutants |

9. Follow-up of agreements and regional cooperation with the countries of Central America and the Caribbean.
10. Inclusion of Indigenous communities in territorial planning.
11. Proper management of beaches as public spaces (access, facilities, and services).
12. Integration of local uses with associated tourism.
13. Incorporation of human rights and the gender perspective in integrating the policy.
14. Implement governance strategies and methods to achieve objectives.

As for the actors in the Policy Decree, the Governor of the State of Quintana Roo, the Secretary of Government, the Secretary of Ecology and Environment, the Secretary of Sustainable Urban Territorial Development, the Secretary of Economic Development, the Secretary of Agricultural, Rural and Fisheries Development and the Secretary of Tourism signs it. These same actors comprise the State Intersectional Commission for Sustainable Coastal Management (Fig. 3).



Table 2: Environmental themes and problems described in the Coastal Policy Decree. (Source: Own elaboration from *Política de Costas del Estado de Quintana Roo* [11].)

| Themes             | Problems                                                                                                                                                                                                                                                                                                                           |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 'Flagship species' | The Strategy for the Conservation and Sustainable Use of Biodiversity of the State of Quintana Roo (ECUSBEQRo) is 'the environmental policy instrument that defines biodiversity priorities'.                                                                                                                                      |
|                    | Provide an overview of the conservation status of ecosystems in the coastal marine zone and a framework for decision-making.                                                                                                                                                                                                       |
|                    | Sea turtles are a species with a high degree of vulnerability exposed to various threats; they provide a fruitful economy around tourism.                                                                                                                                                                                          |
|                    | Inadequate tourism management in the Whale Shark Biosphere Reserve can reduce abundance and sightings in the aggregation area.                                                                                                                                                                                                     |
|                    | The manatee remains vulnerable to various threats.                                                                                                                                                                                                                                                                                 |
|                    | The jaguar is an endangered species under the species umbrella and flag. It requires efforts to conserve biological corridors.                                                                                                                                                                                                     |
| Ecosystems         | Coastal dunes. Highly vulnerable to climate change due to various threats shared with other coastal ecosystems, such as land use change, pollution, and invasion of exotic species.                                                                                                                                                |
|                    | Reef system of the Mexican Caribbean.<br>Various stressors that cause its decrease: climate change, overfishing, excessive tourism and diseases.<br>Massive arrival of Sargasso as a stressor and factor of affection of the reef system.<br>Decline in the quality of coral reef health.<br>Accounting for the blue carbon stock. |
|                    | Seagrasses. Protection is required for its conservation.                                                                                                                                                                                                                                                                           |
|                    | Mangroves. Threats of degradation or loss due to anthropogenic use include deforestation, road construction, and tourism infrastructure. Fragmentation.                                                                                                                                                                            |
|                    | Islands and cays. There is no conceptual legal differentiation. This differentiation is essential for their territorial and ecological management.                                                                                                                                                                                 |
|                    |                                                                                                                                                                                                                                                                                                                                    |





Table 3: Institutional, legal, governance and planning themes and problems described in the Coastal Policy Decree. (Own elaboration from *Política de Costas del Estado de Quintana Roo [11].*)

| Themes                              | Problems                                                                                                                                   |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Institutional, legal framework      | They provide an overview of the conservation status of ecosystems in the coastal marine zone and a framework for decision-making.          |
|                                     | Sea turtles are a species with a high degree of vulnerability exposed to various threats; they provide a fruitful economy around tourism.  |
|                                     | Inadequate tourism management in the Whale Shark Biosphere Reserve can reduce abundance and sightings in the aggregation area.             |
|                                     | The manatee remains vulnerable to various threats.                                                                                         |
| Ports and merchant marine           | The jaguar is an endangered species under the species umbrella and flag. It requires efforts to conserve biological corridors.             |
| Energy                              | Electricity production deficit.                                                                                                            |
|                                     | High transmission costs.                                                                                                                   |
|                                     | High prices for end users.                                                                                                                 |
|                                     | Reduction in productive competitiveness.                                                                                                   |
| Governance and cross-sector aspects | Integration of policies, processes, and programs towards the MIZC.                                                                         |
|                                     | Definition of short, medium, and long-term strategies at a local level.                                                                    |
|                                     | Synergy with the actions of civil society organisations.                                                                                   |
|                                     | Incorporation of available scientific and technological information.                                                                       |
|                                     | Promotion of research actions and social and environmental monitoring.                                                                     |
|                                     | Alignment to the National Policy of Seas and Coasts and the precepts of the High-Level Panel for a Sustainable Ocean Economy.              |
|                                     | Coordination and concurrence of actions between the three levels of government.                                                            |
|                                     | High-Level Panel for a Sustainable Ocean Economy. Endorsement of Mexico in 2018.                                                           |
|                                     | Commitment to the development of a Sustainable Ocean Plan. Opportunity for the development of the Coastal Policy of the Mexican Caribbean. |
|                                     | The efforts of various institutions and civil society organisations require attention and greater coordination.                            |





Table 3: Continued.

| Themes                                                         | Problems                                                                                                                                                                          |
|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strategic planning based on integrated coastal zone management | Diagnosis by SWOT analysis. The higher percentage in strengths and opportunities.                                                                                                 |
|                                                                | Strategic scenarios to meet the needs observed by specialists.                                                                                                                    |
|                                                                | Success pairs (strengths and opportunities).                                                                                                                                      |
|                                                                | Border status and experience in general planning opportunities for regional and international technical and financial cooperation for the MIZC in Quintana Roo.                   |
|                                                                | Leaders in environmental management, fisheries organisations, research institutions, and academic and civil society groups to generate innovative local governance models.        |
| Strategic planning based on integrated coastal zone management | A cosmopolitan society that includes Mayan ancestral knowledge.                                                                                                                   |
|                                                                | Opportunities for implementing commercial strategies focused on green markets.                                                                                                    |
|                                                                | Implementation of climate change mitigation and adaptation actions.                                                                                                               |
|                                                                | Adaptation pairs (weaknesses and opportunities).                                                                                                                                  |
|                                                                | Lack of transversely and comprehensiveness in planning and operation.                                                                                                             |
| Strategic planning based on integrated coastal zone management | Lack of continuity in programs and projects that transcend administrative changes.                                                                                                |
|                                                                | Lack of internalisation of costs of degradation and loss of natural resources.                                                                                                    |
|                                                                | There is a lack of scientific support for evaluating environmental services to influence economic policy.                                                                         |
|                                                                | Reaction pairs (strengths and threats).                                                                                                                                           |
|                                                                | Accelerated population growth triggers:                                                                                                                                           |
| Strategic planning based on integrated coastal zone management | Irregular settlements, deforestation, habitat fragmentation, a deficit of urban services, conditions of poverty, uprooting, unhealthy, and other factors of socioeconomic impact. |
|                                                                | Monitoring and enforcement mechanisms need to be improved.                                                                                                                        |





Figure 3: Installation of the State Intersectional Commission for Sustainable Coastal Management. (Source: Mónica Chargoy, taken on 21 September 2022.)

Throughout the document, however, the following actors are mentioned as related to the themes and problems of the diagnosis:

1. Federal, state, or municipal government entities
  - a. Federal government (seven secretaries)
  - b. State government (three secretaries, two institutions and one committee)
  - c. Municipal governments (eight coastal municipalities)
2. Business groups
  - a. One entrepreneurial group
3. Social groups
  - a. Rural population
  - b. Fisheries and aquaculture communities
  - c. *Punta Allen* Fisheries Cooperative
  - d. Research institutions
  - e. NGOs
4. International
  - a. Commission For Environmental Cooperation (CEC) of the North American Agreement on Environmental Cooperation (NAAEC)
  - b. High-Level Panel for a Sustainable Ocean Economy (Ocean Panel)

As shown in Fig. 4, most of the actors identified are in the political-administrative sphere, in the category of government entities, since they are primarily federal, municipal, or state agencies.

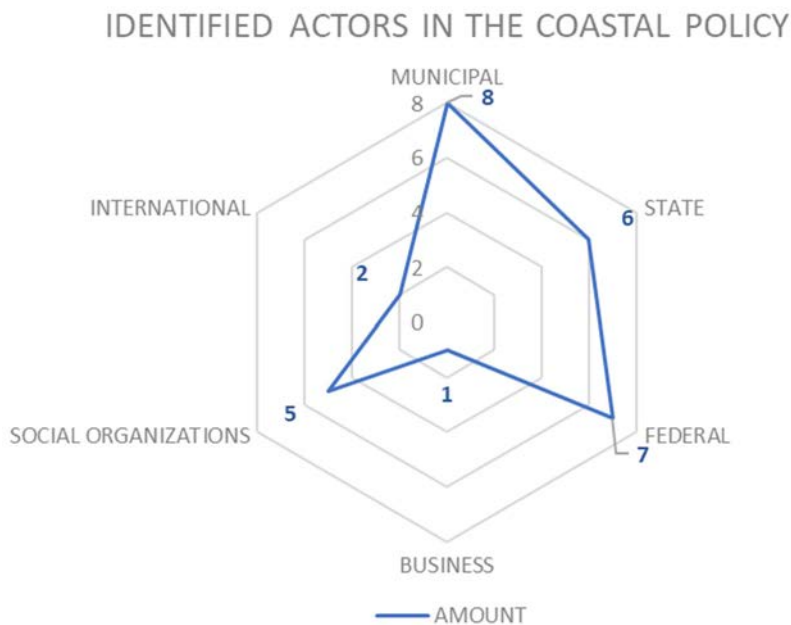


Figure 4: Action area of the actors identified in the coastal policy.

Finally, because of the Strategic Planning based on Integrated Coastal Zone Management, three objectives were developed, with their respective strategies and lines of action, namely: five strategies for objective one, with 26 lines of action; five strategies for objective two, with 27 lines of action; and three strategies for objective three with 15 lines of action. However, these objectives, strategies, and lines of action are written as infinitive actions without a specific subject, or a key actor designated for their execution. At the end of the strategies the document indicates, as a manner of acknowledgment, that the operation of the policy will be based on the attributions and competencies of each institution responsible on the three levels of government through coordination, communication, the concurrence of actions, and acts of authority, as well as annual operational programming and institutional planning [11].

### 5 CONCLUSIONS AND IMPLICATIONS

Not all previously identified actors translate into key actors for the implementation of the Policy. Similarly, in the Strategic Planning section, there is talk of an inclusive design that involved holding two workshops, the first for SWOT analysis and the second for the design of strategic lines. It is mentioned that in these workshops, it was possible to concentrate the perception of specialists from different research institutions, civil society organisations and dependencies of the three levels of government, but the decree does not mention details or identify these specialists. Undoubtedly, this lack of identification of key actors for the execution of the Policy has direct repercussions on its progressive progress to the next stages and its implementation at the local level, which will be analysed in the following stages of the research.

This is the first part of a broader analysis of Coastal Policy. It is limited to identifying and evaluating key issues in the Coastal Policy Decree according to the proposed methodology. The following steps are to evaluate the current situation of the MIZC in the emerging tourism



destinations at the southern Mexican Caribbean in Quintana Roo, with respect to what is defined in the Coastal Policy, taking this identification of critical issues and identified actors as a base for the next level of analysis, completing the following steps on the methodology proposed by Olsen and Ochoa [12] and the methodological conceptions of Olsen–ECOCOSTAS–LOICZ, combined with the methodology of Barragán’s *Decálogo*.

The expected outcome would be a proposal of a set of strategic and operational guidelines to move towards the adoption and implementation of a MIZC model that adequately responds to the new Coastal Policy of the State of Quintana Roo, which:

1. would fulfil the function of a framework model for the MIZC in the territorial intermediate scale: level of the State of Quintana Roo, in response to its pioneering Coastal Policy in the country, which at the same time:
2. also corresponds to the country’s Seas and Coasts Policy.
3. serves as a starting point for initiatives and programs at the local level.

This will have direct repercussions on the way activities are carried out in the coastal zone, highlighting all the uses identified in the Policy, particularly tourism, the state’s main economic activity.

#### REFERENCES

- [1] Secretaría de Turismo del Estado de Quintana Roo, Quintana Roo: How are we doing in tourism? February 2024 vs February 2023. Chetumal, Quintana Roo, pp. 3–21, 2024. [https://sedeturqroo.gob.mx/ARCHIVOS/comovamos/como\\_vamos\\_202402.pdf](https://sedeturqroo.gob.mx/ARCHIVOS/comovamos/como_vamos_202402.pdf). (In Spanish.)
- [2] Rivera-Arriaga, E. & Azuz-Adeath, I.A., Implementing the SDG14 in Mexico: Diagnosis and ways forward. *Costas*, **1**(1), pp. 219–242, 2019. <https://doi.org/10.26359/costas.0112>.
- [3] INEGI, Consultation systems: Space and data of Mexico. <https://www.inegi.org.mx/app/mapa/espacioydatos/>. (In Spanish.)
- [4] Milanés Batista, C., Lastra Mier, R.E. & Sierra-Correa, P.C., Case studies on integrated management of coastal zones in Latin America: Management, risk and good practices. Corporación Universidad de la Costa: Barranquilla, Colombia, p. 10, 2019.
- [5] Barragán Muñoz, J.M., *Politics, Management and Coastline: A New Vision of Integrated Management of Coastal Areas*, Tébar Flores, S.L.: Madrid, 2014. (In Spanish.)
- [6] Olsen, S., Lowry, K. & Tobey, J., *A Manual for Assessing Progress in Coastal Management*, Coastal Resources Center, University of Rhode Island, Graduate School of Oceanography: USA, pp. 6, 9, 10, 1999. [https://pdf.usaid.gov/pdf\\_docs/Pnach693.pdf](https://pdf.usaid.gov/pdf_docs/Pnach693.pdf).
- [7] Rivera-Arriaga, E. et al., Global review of ICZM in Mexico. *Costas*, **1**, pp. 133–154, 2020. <https://doi.org/10.26359/costas.e107>.
- [8] Azuz Adeath, I. & Rivera Arriaga, E., Spatial and temporal scales of coastal management. *Coastal Management in Mexico*, eds E. Rivera Arriaga, G.J. Villalobos, I. Azuz Adeath & F. Rosado May, Centro de Ecología, Pesquerías y Oceanografía del Golfo de México (EPOMEX), Universidad Autónoma de Campeche: Campeche, pp. 27–37, 2004. [http://etzna.uacam.mx/epomex/pdf/Manejo\\_Costero.pdf](http://etzna.uacam.mx/epomex/pdf/Manejo_Costero.pdf). (In Spanish.)
- [9] Frausto-Martínez, O. & Colín-Olivares, O., Sustainability indicators of the Seas and Coasts Policy: Mexico. *Costas*, **1**(2), pp. 41–58, 2019. <https://hum117.uca.es/wp-content/uploads/2020/05/1203.pdf>. (In Spanish.)



- [10] Vázquez Sosa, A., Frausto Martínez, O. & Cabrera Hernández, J.A., Models of integrated coastal zone management: Comparative analysis and adoption proposal in the case of Akumal (Mexico). *Costas*, 2(1), pp. 25–50, 2020.  
<https://doi.org/10.26359/costas.0202>. (In Spanish.)
- [11] Política de Costas del Estado de Quintana Roo, *Periódico Oficial del Estado de Quintana Roo*, **Tomo II**(142 Extraordinario), Novena Época, pp. 58,70, 82, 2022.
- [12] Olsen, S.B. & Ochoa, E., *The Why and How of a Baseline for Governance in Coastal Ecosystems*. ECOCOSTAS, CRC Rhode Island, AVINA, LOICZ, USAID: Guayaquil, p. 24, 2007. [https://pdf.usaid.gov/pdf\\_docs/pnaeb386.pdf](https://pdf.usaid.gov/pdf_docs/pnaeb386.pdf). Accessed on: 18 Apr. 2023. (In Spanish.)
- [13] Rojas Giraldo, X., Sierra Correa, P.C., Lozano Rivera, P. & López Rodríguez, Á.C., *Methodological Guide for the Integrated Management of Coastal Zones in Colombia. Manual 2: Coastal Zone Planning*. INVEMAR: Bogotá, Colombia, 2010.  
<https://www.cbd.int/doc/meetings/mar/mcbem-2014-04/other/mcbem-2014-04-co-manual-2-es.pdf>. (In Spanish.)

